

Accelerator Systems Division Highlights Ending July 30, 2004

ASD/LANL: Warm Linac

The RFQ appears to be running well and ready for the upcoming commissioning run.

-MEBT diagnostic box installation has been completed for the moment and the system is under vacuum.

-DTLs 1 – 6 have all been conditioned to full power at 10hz and full pulse width (1ms). A couple of them have had the rep rate brought up to 20hz as well. Some “tweaking” has been necessary but all of the systems now seem to be running quite well.

-We continue to look for ways to increase the reliability and functionality of the DTL and CCL cooling systems (RCCS's).

-CCLs 1 – 3 have all been conditioned to full power at 10hz and full pulse width. There will be some attempts over the weekend to extend the rep rate.

-The Quad Magnet Cooling System (QMCS) is up and running to allow magnet testing and cavity operations.

-CCL 4 was sealed and pumping began Friday.

-All CCL quad magnets are installed and aligned. Covers are still being fitted

-Substantial time was spent designing the final beam stop transport and shielding configuration and parts are now being made. The schedule is tight but manageable.

-The shielding walls downstream of CCL 4 which will allow the next commissioning to occur are built up to the aisle way. They will be completed just before the run.

LANL is still shut down for technical work, though some administrative work has been started.

ASD/JLAB: Cold Linac

ASD/BNL: Ring

ORNL activities:

An ASD/XFD interface meeting was held on Monday, 26/Jul. The primary focus was coordinating installation activities, in particular scheduling the use of the 50 ton crane and how to stack the shielding as it is removed to gain access to the RTBT.

An intermediate design review was held Tuesday, 27/Jul, to discuss the design of the end of the RTBT (downstream of quad magnet Q26). Overall the design work is proceeding very well. Several issues came up, including the corrosive effects and control of radioactive air, and the accuracy of beam positioning on the target. We are also investigating the details of cleanup and subsequent operations in the event of a vacuum window failure.

We now have set of four 21Q40 quads matched to better than 0.1% ITF, ready to be installed into the HEBT arc.

BNL activities:

Half-cell #31 was shipped to SNS/OR this week.

Half-cell #32 (our last half-cell) is undergoing final QA inspections. We plan to ship this unit on Tuesday, August 3rd.

All new requisitions, change orders, credit card orders, shop withdrawals, travel and equipment deliveries are temporarily on-hold; all expenditures are being reviewed on a case-by-case basis and approved as funding permits.

Revised lattice files, including the new locations for RTBT magnets #Q28, Q29 & Q30 have been forwarded to ASD by Deepak Raparia.

The Ring straight section equipment delivery schedule, an integral part of the Diagnostics' Production Plan, is being updated for review with ASD. The review date has been set for Monday, August 23rd, at 4 pm.

RTBT/Target Area: Two design reviews were conducted this week; one by BNL's Charles Pearson on the design and support of the radiation hardened magnet elements; a second by ASD's Mike Holding on overall design issues including assembly, shielding and infrastructure.

The SNS upstream long injection kicker magnet has passed all tests and the vacuum chambers have been leak checked and aligned. This magnet is now ready for shipment to SNS/OR; shipment will follow half-cell #32 and RF#3 (cavity and PA).

Drawings for the IPM internal electronics housing (upper and lower housings) have been reviewed and approved. Our Shops will be asked to prioritize this work so that parts can arrive on time for TiN coating with the IPM vacuum chambers, which have been fabricated.

New England TechniCoil (NETC): The repaired injection dump septum magnet #2 was returned to BNL this week. This magnet will be added to the injection straight section mock-up assembly in building 905. Dump septum magnet #1, currently in the magnet test station, will be returned to NETC for repair of the coil insulation after all magnetic measurements are finished.

PFN high voltage modulator #8 has been successfully tested. Testing of PFN #9 is currently underway. Our vendor, Applied Power Systems (APS), has decided to ship four at a time to SNS/OR from this point forward.

Alpha Magnetics and their sub-contractor, Bay Cast, are still having problems producing magnet steel for the Extraction Lambertson Septum magnet core. A second trial pour was rejected this week because of porosity in the test sample. Alternate options are being explored by BNL and Alpha Magnetics.

Chicane #4: the leaky vacuum chamber has been repaired, leak tested and accepted for the injection straight section mock-up assembly.

Our vacuum group continues with TiN coating of diagnostic equipment (bellows, adaptors, etc.) for the RF straight section and for the extraction kicker magnets.

BNL/SNS designers, engineers, scientists and support staff gathered around the Ring half-cell unit #32 (BNL's last half-cell assembly) for a group photo in recognition of this delivery milestone.

Controls

Installation of MPS hardware required for the DTL/CCL operations has been completed. MPS software has been initialized in all IOCS except CCL_BLM1 and CCL_BLM2. The field cabling is currently being checked. Monday we plan to start MPS testing.

Field work and PLC programming in preparation for the conversion to PPS phase 1.2 is complete. This phase will allow operation of the Linac as two separate controlled areas. Beam will be run in the warm section, RF processing will be done in the cold section. Each section may be run independently of the other. Documentation for phase 1.2 was completed. A document package to install PPS conduit and cabling in the Ring and RTBT has been prepared.

Linac ODH integration testing is in progress. Linac ODH drawings are being as-built.

Ring cable design activities continue. Foil and scraper cable types were changed to meet code (600V) and approved.

Title II design of the Central Control Room Console has begun. Meetings have been held with DCS (a possible vendor), Cecil Peters (architect), Dan Ciarlette (IT Group), Jeff Geouque (Procurement), and Kathlyn Boudwin (CLO area manager). We are working towards reaching a consensus on how to get the console designed and fabricated. Operations personnel will be in the approval cycle for the console design.

Software development activities included the following: For LLRF, RF load and cavity voltage calculations were implemented. Software for additional SCL IOCs was prepared. Work is in progress for a script that helps to combine daily into e.g. monthly archives. We are looking into a channel access "disconnect" problem: some channels that don't get new data for a while seem to turn "disconnected".

We now have a "generalTime" time source manager running. This application services time stamp requests and transparently manages obtaining time stamps from the best-available time source. e.g. If RTDL fails, generalTime will automatically roll back to provide time from an NTP server. "generalTime" fits seamlessly into our existing architecture so no changes to existing applications are required.

Chip Piller from the ORNL RF group visited BNL this week to work with the BNL RF group. While there, he reviewed current status of Ring LLRF controls.

Installation

Craft Snapshot 7/20/04

| | |
|-------------------------------|-------------|
| ASD productive craft workers | 64.0 |
| Foremen (Pd by 15% OH) | 5.0 |
| AMSI management (Pd directly) | 3.0 |
| TOTAL AMSI WORKERS | 72.0 |
| Less WBS 1.9, 1.2 etc | 11.0 |
| Less absent | 0.0 |
| TOTAL PD BY ASD/ORNL DB WPs | 53.0 |

Accelerator Physics

Operations

Operations ran nights and weekends when possible and staffed the Control Room during the day shift. All DTLs and CCL 1-3 were processed to the specified levels at 10 Hz and 1 mS with LLRF in Open Loop. We are proceeding with closed loop processing as the closed loop problems are fixed.

Scheduling for the SCL

Maintaining the Detailed schedule

Developing a high level schedule for CHL Turn-on, Transfer line cool-down and SCL RF processing including reviews, ODH installation /certification etc.

Preparing for the ARR

Video Conference presentations on Thursday August 19

On site visit and report writing Tuesday-Thursday August 24-26 with a close out

On Thursday from 11:00-12:00

Must present information on Cryo Hazard and Safety for the DTL-CCL enclosure

Radiation Design Working Group meeting last Thursday and another one Tomorrow to finalize details of the beam stop transport and storage.

Maintenance Coordinator Meeting, Gathering Maintenance plans and records. Working on the Datastream implementation, CF is now ahead of ASD. We need to work to rectify this situation

Working with Controls and CF on issues related to control and monitoring of CF equipment and SNS utility use from the Control Room.

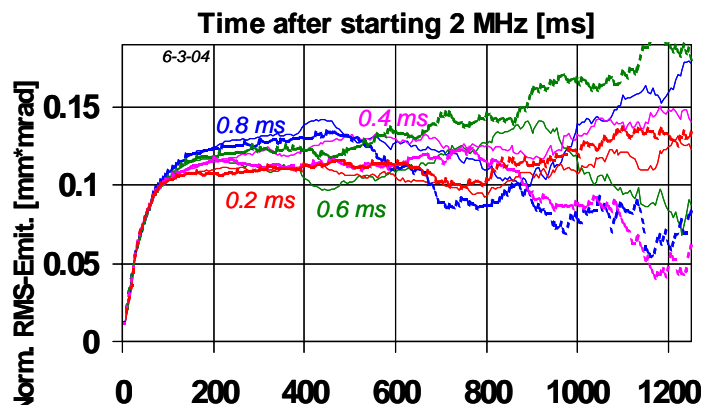
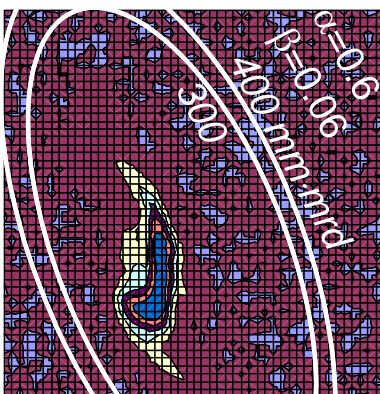
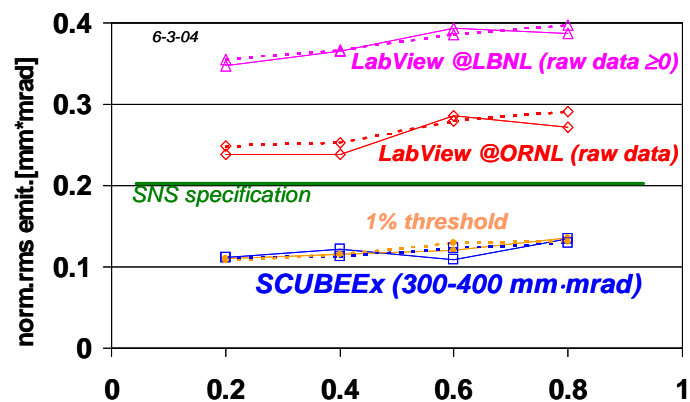
Ion Source

Ion Source Group Highlights for the week ending 7-30-04

We have terminated another 10 day run at a 7.4% duty cycle. After cesiation the source output was slightly above 30 mA and dropped over a 10 day period to about 20 mA. A new source has been installed and is being conditioned.

We have completed the analysis of the LEBT emittances measured on the ion source hot spare stand in collaboration with Matthaeus Leitner from LBNL. The data show a well focused beam of less than 2 mm FWHM. If the negative signals are ignored, as originally at LBNL, the normalized rms emittance is about 0.35 mm-mrad. Including all raw signals decreases the result to 0.25 mm-mrad. A self consistent, unbiased elliptical exclusion analysis gives rms emittances in the range of 0.11 to 0.13 mm-mrad.

The analysis code has been cross checked with results obtained with two other codes developed at two other labs. The position and angle conversion has been cross checked within 10%. In 10 days we will perform an accurate calibration after having replaced the deflector plates to eliminate the inverted signals found at large angles.



Survey and Alignment

CCL

CCL4 magnet alignment was completed Thursday. The re-alignment of two (just installed) CCL Magnet/BSM assemblies CCL module 1 is being addressed today (Friday).

BEAM STOP

We will align the beam stop at the end of CCL4 once it is installed. As yet it is not in the tunnel.

DIAGNOSTICS DEVICES

We have a request from the Diagnostics Group to “final” map Linac BLM and ND devices. This task will be accomplished in the near future.

With respect to the Front End, we have also have a request to map the D_Box after the completion/installation of all diagnostic devices. The Diagnostics Group will inform us when they are ready for our services.

LINAC ELEVATION MEASUREMENTS

This week we began a leveling campaign of all linac floor and wall monuments. This information will be required soon for the alignment of the MB Cryos and Warm Sections scheduled in early August.

HEBT / RING ALIGNMENT

The realignment of the Hebt continues when resources are available. To date we have completed the re-alignment of all straight section HEBT components up to and including the DH25 Dipole. Upon completion HEBT component alignment, we will begin the initial alignment of the ring.

TARGET

S & A completed translating our “as built” chopper cavity measurement data into a format more usable by beam line engineers and scientists. These measurements will provide valuable information for beam line engineers and scientists designing components for their respective beam lines.

We will also perform the same data translation planned for our “as built” core vessel insert data.

MAGNET FIDUCIALIZATION

One additional 8Q35 Magnet was fiducialized this week.

Finally, this week, Survey and Alignment personnel underwent annual CPR/AED recertification.

A two week look ahead of S & A priorities are as follows:

1. Complete any remaining FE/DTL/CCL activities requiring our assistance (see above).
2. Support necessary target/instrument activities
3. Linac Leveling Campaign
4. Hebt Re-Alignment
5. Magnet Fiducialization

Mechanical Group

Water Systems Installation activities occurring in the week ending July 30 include:

- Installation of the DI piping to the SCL-ME5 second set of Thales klystrons was started with pressure testing scheduled for next week.
- Installation of the DI piping to the RF equipment from the second SCL-ME6 TRCC cart continued.
- The first TRCC cart for SCL-ME7 was moved into position.
- Piping tie-ins to all the CCL4 magnets was completed.
- Installation of the SCL QMCS header continued.
- The DI system for the RFTF clean room was completed.
- Installation of pneumatic lines to the DTL and CCL vacuum control valves continued.
- Modification to the CHL compressor piping continues.

Ring Systems Installation activities occurring the week ending July 30 include:

- The RING Half-Cell #31 (C6) was received and staged for installation.
- The RING "A" arc was reassembled and successfully leak tested.
- The RING "C" arc subsections were successfully leak tested.
- A shipment of 4 RTBT beamline diagnostic wire scanner chambers and their support structures was received.
- The installation of the laser-stripping system in the HEBT Continues.
- The installation of vacuum and diagnostic cables into the HEBT tunnel continued.
- The floor of RTBT to Target interface section of the tunnel was painted by the AE/CM.

Magnet Task

- All CCL Quads are installed.
- Four 21Q40's meet the 0.1% specification. Work has started on assembly of HEBT 21Q40 intersegments.
- We have started assembling the first SRF Warm Section. We continue to measure 8Q35's.

Electrical Group

Magnet Power Supplies:

Four 4000A, 18V Medium magnet power supplies have been delivered, bringing the total on this order to 41 of 77. One Injection magnet kicker power supply has been delivered, bringing the total on this order to 5 of 9.

The magnet power supplies for the first 8 magnets of CCL4 have been powered to the magnets and checked out. The power supplies for the remaining 4 magnets in CCL4 have been connected to the magnets and will be tested next week, completing all power supplies in the warm Linac.

Michael Littleton, research mechanic, joined our group this week.

Linac

CCL 4 cable terminations declared done (some minor rework with check out anticipated)
SCL KL-SS2 and part of KL-SS3 AC distribution up to rack row 10 complete, check out in progress, anticipated finish of check out is Monday the 2nd of August.
HEBT vacuum cabling except section valves cables pulled, BPM cables pulled
BLM conduit in the tunnel complete.

HPRF

MEBT: Ground Plane installed and four amplifiers tested to nominal operating power into short. RF systems have been reconnected to the MEBT cavities.

DTL: DTL5 back in operation with new circulator with no problems. DTL5 structure has been conditioned to full operating power.

CCL: CCL4 klystron collector lead shielding has been completed with outside crane and the 5MW klystron is back in place with water connections made.

SCL: SCL ME1 has been operating all twelve klystrons in the diode mode. Klystrons are in the process of being checked for forward and reflected power and EPICS controls integration.

SCL ME6 klystrons have been transferred to the gallery. Seventy SCL klystrons (of 81) are now in place or staged in the Klystron Gallery.

RFTF: Coupler testing has resumed with no problems since HVCM repair. Another pair was completed today.

LLRF

Cryo-Group

Beam Diagnostics